



ROBOTICS & AUTOMATION

INNOVATION THROUGH AUTOMATION

Downer
Relationships creating success

FMT Digital Powered by TrainDNA



Train Examination System

The future of Automated Train Inspections

The **Train Examination System (TRES)** is an autonomous inspection robot for rollingstock assets. It is equipped with FMT's sensor kits using the latest LiDAR, Laser, and Optical technology to identify rollingstock component condition and defects.

TRES is a fully **autonomous** system that provides the unique capability to perform inspections without any required civil work or modification to existing Maintenance Facilities. Through highly configurable inspections, TRES is typically able to **automate up to 70% of underframe inspections**. TRES creates detailed and accurate 3D models of train components. These models are used to perform a range of critical measurements.

The novel integrated sensor technology, enhanced with **Artificial Intelligence and Machine Learning** capabilities, can be programmed to perform fit-for-purpose inspections within strict rail-industry tolerance and accuracy requirements.

TRES is **integration ready** – asset data is used to derive insights and generate maintenance alerts in *your* Operational Environment and Systems.

Business benefits

Increased safety



Reduces personnel exposure to high-risk and ergonomically difficult tasks by automating inspections

Systems Assurance



Ensures high accuracy and repeatability through automating inspections.

Operations Optimisation



Minimises downtime and maintenance costs by detecting faults before failures, automating repetitive labour-intensive inspection tasks, and optimising key-subsystem management.



Artificial Intelligence



Autonomous



Integration Ready



Configurable Inspections



Multi-Robot Ready



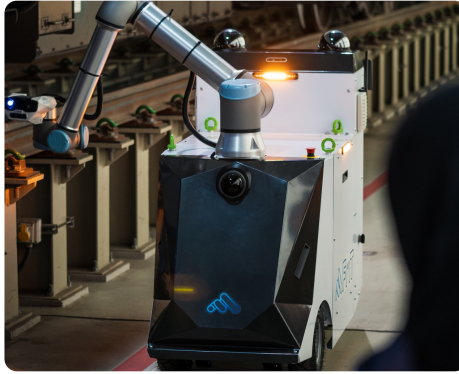
Digital Twin

Train Examination System

Autonomous Sensor



Autonomous Charge



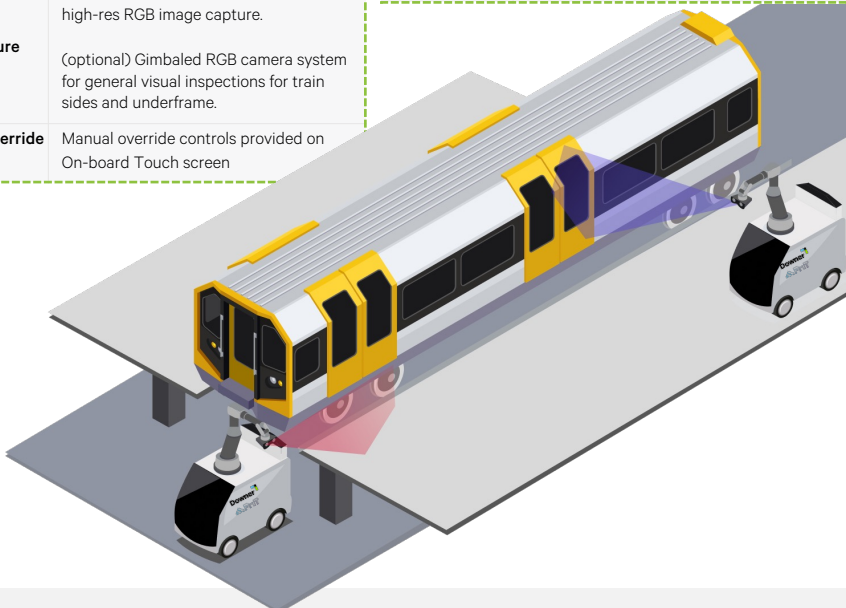
Autonomous Management



Autonomous Inspection Robot	
Autonomy	Fully autonomous navigation of maintenance depots. This includes maintenance pits, inside sheds and stabling roads.
Inspection Capability	Over 50 tested and proven automated inspections globally. Examples include: Wheel Measurements Third-Rail Shoe Thickness Measurements Torque Mark Alignment Check Gearbox Oil Level Check
Body	Aluminium and Steel Structure – customised to Client requirements
Size	Length 1533mm Height 1251mm Width 720mm Note this is a typical size that suits most pit/depot designs. The size of TRES is tailored to Client facility and Rollingstock requirements
Movement	Rubber wheels or rubber tracks
Power	Electric Motor, Battery-powered Electric propulsion
Safety	Emergency Stop Buttons and On-board Obstacle Detection System
Lighting	Sensor Projector System
Processing	Dedicated on-board systems for Navigation Control and Data Processing
Data Capture	FMT Sensor Kit for 3D point cloud and high-res RGB image capture. (optional) Gimbaled RGB camera system for general visual inspections for train sides and underframe.
Manual Override Control	Manual override controls provided on On-board Touch screen

Autonomous Charging Dock	
Autonomy	Autonomous docking, charging & transfer data
Dimensions	Length 800mm Height 900mm Width 600mm
Input Power	240V 15A AC GPO
Charge Time	80 minutes
Communication	Ethernet, Wi-Fi, 5G
Docking Mechanism	Wired Fast-Charging and Wireless Communications (Optional) Wireless charging

Autonomous management through mission control and monitoring	
User Interface	User focused interface includes: <ul style="list-style-type: none"> • Mission selection and details • Mission status and robot telemetry • Remote triggering to start or stop a mission
Remote Site Configuration*	Set up of missions and inspection navigation algorithms * Site configuration is managed through engineering change processes to ensure site safety and system integrity
Autonomous Analytics Pipeline	Configuration of point-cloud-, ML- and AI-powered analytics for component identification and inspection. Algorithms conduct analysis on: <ul style="list-style-type: none"> • Asset Condition reporting of inspected components with photographic evidence • Long-term trending for Condition-Based Maintenance (CBM)
Data Management	Railway systems compliant data management: <ul style="list-style-type: none"> • On-premise or cloud-based options • Secure API & authentication for data transfer • Automated backups
Real-time Monitoring	Real-time telemetry and alerting: <ul style="list-style-type: none"> • Critical alerts for mission • Mission progress data • Health and performance data; battery life, signal strength, etc.



Business solutions

TRES tackles **key rail maintenance challenges**:

TRES removes workforce from performing inspections in ergonomically difficult conditions
– **Increases Safety**

TRES ensures that all Rollingstock measurements are performed with high accuracy and repeatability. TRES allows for data to be interrogated without manual handling:
– **Optimises Operations**

TRES has low implementation costs and high inspection capability
– **Reduces asset life-cycle costs**